INITIAL STATEMENT OF REASONS

PROPOSED REVISIONS TO THE CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS (CALIFORNIA ENERGY CODE) CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 1, CHAPTER 10, AND PART 6

2005 BUILDING ENERGY EFFICIENCY STANDARDS

I. STATEMENT OF SPECIFIC PURPOSE AND RATIONALE

Title 24 Parts Affected:

Part 1, Sections 10-102, 10-103, 10-109, 10-110, 10-111, 10-113, 10-114

Part 6, Sections 100, 101, 102, 111, 112, 113, 114, 116, 118, 119, 121, 122, 123, 124, 130, 131, 132, 133, 140, 141, 142, 143, 144, 146, 147, 148, 149, 150, 151, 152, Appendix 1-A

Purpose and Rationale:

The California Energy Commission is proposing to adopt revisions to the California Building Energy Efficiency Standards (California Energy Code) for the following reasons:

1. Respond to California's energy crisis to reduce energy bills, increase the reliability of the energy system, and contribute to an improvement in California's economic condition;

2. Respond to the AB 970 (Statutes of 2000) urgency legislation to adopt and implement updated and cost-effective building energy efficiency standards to ensure maximum reductions in wasteful, uneconomic, inefficient or unnecessary consumption of electricity at the earliest feasible date;

3. Respond to the SB 5X (Statutes of 2001) urgency legislation to adopt energy efficiency building standards for outdoor lighting;

4. Pursue major objectives of the California Energy Commission, including adaptation of the Standards to emphasize energy efficiency measures that save energy at peak periods and seasons; encourage improvements in the quality of installation of energy efficiency measures, adopt requirements based on recent public funded building science research, and collaborate with the California utilities to coordinate Standards updates with public funded market incentives programs that have demonstrated that specific technologies are appropriate for incorporation into Standards.

The foundation law governing adoption and implementation of the California Building Energy Efficiency Standards requires the Commission to adopt both performance standards (Public Resources Code 25402 (b)) and prescriptive standards (Public Resources Code 25402 (b)). By adopting both types of requirements, the Standards both provide maximum flexibility as well as a simplified approach.

The new Standards requirements are described in detail in the Notice of Proposed Action. The changes are proposed based on the following rationale. The performance standards for both residential and nonresidential buildings will be changed to use Time Dependent Valuation to substantially increase the importance of measures saving energy at peak periods and seasons relative to off-peak periods.

In nonresidential buildings the energy wasteful practice of placing insulation on top of suspended ceilings will be dramatically reduced. Cool roofs will become the prescriptive requirement and basis of the performance standards for both new and reroofs for nonresidential buildings with low-slope roofs based on cost effectiveness analysis conclusions. Demand control ventilation will be required where appropriate in spaces with moderate to high occupant densities based on cost effectiveness conclusions. Acceptance requirements will be established to insure that equipment required by the Standards is installed correctly and achieves the energy savings expected by the Standards. Increased duct insulation levels, where cost effective, will be required in both nonresidential and residential buildings. Allowed lighting power densities in nonresidential buildings will be reduced based on cost effectiveness analysis of new energy efficient lighting equipment. To avoid thermal "short circuits" in roofs with metal framing or metal decks, which virtually nullify the energy savings benefit of insulation installed between the metal framing members, continuous insulation will have to be installed between the roof deck and the structural members when complying with prescriptive R-value requirements. A requirement will be added to the prescriptive standards and energy budget for skylights with daylighting controls to turn off lighting in daylit spaces in large one and two story buildings with high ceilings where this technology has been shown to be cost effective. The Standards will require variable speed heating, ventilating and air conditioning systems where they are found to be cost effective. Cost effective electronically-commutated fan motors will be required for series fan-powered terminal units. Cost effective improved controls will be required for cooling towers, and cooling towers will be required to be certified by the Cooling Technology Institute to insure that required efficiency levels are achieved. The use of air-cooled chillers will be limited in large chilled water plants where water-cooled chillers are cost effective. Hydronic systems will be required to have variable flow, use motors with variable speed drives, and have controls to make operation more energy efficient where cost effective. Duct systems in unconditioned and indirectly conditioned spaces in newly constructed buildings, additions and in alterations to existing buildings will be required to be tested, sealed and verified to insure that the substantial energy waste due to duct leaks common in these ducts is avoided. The tailored lighting approach will be improved to require more energy efficient equipment, to constrain its use to only those situations where it is truly needed, and to simplify its use in those cases. Cost effective lighting efficiency requirements are established for the first time for unconditioned buildings in response to SB 5X.

Outdoor lighting requirements will be established for the first time in response to SB 5X, including lighting power allowances for specific outdoor lighting applications that vary by lighting zone depending on the ambient light in those zones, as recommended by national and international consensus lighting standards setting organizations. Requirements for luminaire shielding will also be established to save energy by reducing glare, and requirements for lighting controls will be established to provide facility owners with the capability to save energy by turning off outdoor lighting when they determine that lower light levels are appropriate. The Outdoor lighting requirements provide local governments considerable discretion to adjust lighting zones and to enable nonresidential facilities to have higher lighting power allowances when local ordinances are adopted which call for high illumination levels. The outdoor lighting requirements are fashioned after the lighting requirements for indoor lighting, which have effectively saved energy in California over the past 25 years.

Lighting power allowances will be established for indoor and outdoor signs based on extremely cost effective lighting technologies. The requirements for signs allow both a performance approach and prescriptive options to provide maximum flexibility for compliance.

In low-rise residential buildings, the standards will change the energy budget to be based on new federal appliance efficiency standards for air conditioners and water heaters. New requirements determined to be cost effective will be established for increased duct insulation levels, insulation on hot water pipes running to the kitchen, and for high efficiency residential lighting equipment. The residential lighting requirements will simplify current requirements for kitchens and bathrooms, and will add cost effective requirements for other permanently installed lighting equipment, including exterior lighting installed on buildings. These requirements recognize the substantial improvements that have occurred in recent years in the reliability, availability, lowered costs and consumer acceptance of energy efficient lighting equipment and controls. The Standards also change performance standards rules to eliminate loopholes related to window areas and water heating that have allowed some residential buildings, particularly multi-family buildings, to avoid cost effective energy efficiency measures. The Standards also will add to the current requirements for alterations to existing residential buildings by requiring replacement windows to be energy efficient and for duct systems to be tested, sealed and field verified to reduce energy waste when heating and air conditioning systems are altered. These added requirements for residential alterations are extremely cost effective, and are expected to substantially reduce energy bills and make existing residences more affordable to operate.

The Alternative Calculation Method (ACM) Approval Manuals for residential and nonresidential buildings will be substantially updated to improve clarity, organization and ease of use, and new "Joint Appendices" will be added to support implementation and development and approval of alternative calculation methods computer software for the performance standards. The ACM Manuals will add several new compliance options that will increase compliance flexibility and encourage the voluntary use of emerging new energy efficiency technologies and quality construction practices. For measures requiring diagnostic testing and field verification, protocols in the appendices to the ACM Manuals will be improved to be more specific and to facilitate their use. Procedures for field verification are improved to provide early notification of Home Energy Rating System (HERS) providers when measures requiring field verification have been chosen for compliance and to establish a role for Third Party Quality Control Programs.

The entire set of Standards, ACM Manuals and Joint Appendices have been thoroughly reviewed and updated to improve clarity, accuracy and ease of use.

II. DOCUMENTS AND REPORTS RELIED UPON

"White Paper on Outdoor Lighting Code Issues," Publication number LSD-11-2000, National Electrical Manufacturers Association, 8/01/2000

"Characterization of Framing Factors for Low-Rise Residential Building Envelopes in California." Enermodal Engineering Limited in association with Chitwood Energy Management for the California Energy Commission, 11/2001

Letter from John Lamborn, President, JP Lamborn Company. Re: Duct R-Values, 11/14/2001

"Statement of Principles on Outdoor Lighting Codes." National Electrical Manufacturers Association, 10/24/2001

"An Evaluation of Three Types of Gas Station Canopy Lighting." Lighting Research Center, 12/28/2001.

"Notice of Conclusions on Maximum Scope of the 2005 Building Energy Efficiency Standards." California Energy Commission. 01/18/2002

"Recommended Model Outdoor Lighting Regulation." National Electrical Manufacturers Association, 2/2002

"Bi-Level Exterior Lighting Control." The Watt Stopper, 3/2002.

"Lighting Controls for Unconditioned Buildings." The Watt Stopper, 3/2002

"Recommended Practices and Standards for Outdoor Lighting Applications." National Electrical Manufacturers Association, 03/2002

"Life Cycle Cost Methodology Report." Publication Number P400-02-009. Eley Associates for the California Energy Commission, 03/11/2002

"Time Dependent Valuation – Economics Methodology." Heschong-Mahone Group for Pacific Gas & Electric Company, 03/14/2002

"Window Efficiency Requirements Upon Window Replacement." Heschong-Mahone Group in association with Enercomp for Pacific Gas & Electric Company, 03/15/2002

"Residential Computer Modeling Draft Report." Berkeley Solar Group for the California Energy Commission, 03/21/2002

"Lighting/Lighting Occupancy Control Systems for Multi-Level Outdoor and/or Underground Parking." Southern California Edison, 3/26/2002

"Acceptance Requirements for Nonresidential Buildings." Publication Number P400-02-010. New Buildings Institute for the California Energy Commission, 04/08/2002

"Cooling Towers." Heschong-Mahone Group in association with Taylor Engineering for Pacific Gas & Electric Company, 04/08/2002

"Part I - Measure Analysis and Life-Cycle Cost." [Lighting Power Allowances, Demand Control Ventilation, Construction Quality (Walls), Water Heating Distribution.] Publication Number P400-02-011. Eley Associates in association with Benya Lighting Design, Taylor Engineering, Berkeley Solar Group and Davis Energy Group, 04/11/2002

"Multifamily Water Heating." Davis Energy Group for Pacific Gas & Electric Company, 05/07/2002

"Residential Hardwired Lighting." Heschong-Mahone Group for Pacific Gas & Electric Company, 05/07/2002

"Duct Sealing Requirements upon HVAC or Duct-System Replacement." Heschong-Mahone Group in association with Modera Consulting Engineers for Pacific Gas & Electric Company, 05/08/2002

"Updates to Title 24 Treatment of Skylights." Heschong-Mahone Group for Pacific Gas & Electric Company, 05/14/2002

"Hourly Water Heating Calculations." Eley Associates for Pacific Gas & Electric Company, 05/15/2002

"Part II – Measure Analysis and Life-Cycle Cost." [Residential Fenestration, Hydronics.] Publication Number P400-02-012. Eley Associates in association with Berkeley Solar Group, Enercomp Inc., and Taylor Engineering for the California Energy Commission, 5/16/2002

"Bi-Level Lighting Control Credits." Heschong-Mahone Group for Pacific Gas & Electric Company, 06/27/2002

"High Performance Relocatable Classrooms." Davis Energy Group for Pacific Gas & Electric Company, 06/28/2002

"Nonresidential Duct Sealing and Insulation." Heschong-Mahone Group, Modera Consulting Engineers, and Architectural Energy Corporation for Pacific Gas & Electric Company, 07/02/2002

"Part III – Measure Analysis and Life-Cycle Cost." [Maximum Allowable Cooling Capacity, Residential Ducts, Residential Construction Quality-Attics, Revised Tailored Method for Allowed Lighting Power.] Publication Number P400-02-013. Eley Associates in association with Berkeley Solar Group, Enercomp, Inc., Proctor Engineering Group, Davis Energy Group and Benya Lighting Design for the California Energy Commission, 07/03/2002

"Inclusion of Cool Roofs in Nonresidential Title 24 prescriptive Requirements (Revised)." Hashem Akbari (LBNL) and Ronnen Leninson (LBNL) for Pacific Gas & Electric Company, 08/2002.

"Gas Cooling Compliance Options for Residential and Non-Residential Buildings." A.Y. Ahmed of Occidental Analytical Group, Davis Energy Group for Southern California Gas Company, 08/12/2002

"Part IV – Measure Analysis and Life Cycle Cost." [Electronically-Commutated Motors in Series Terminal Units, Size Thresholds for Variable Speed Drives, Lay-In Insulation in Nonresidential Buildings.] Publication Number P400-02-014. Eley Associates in association with Taylor Engineering, New Buildings Institute, Architectural Energy Corporation and Modera Consulting Engineers for the California Energy Commission, 08/13/2002

Letter from Jim Cassis, California Billboard Association, Re: Lighting of Billboards, 9/12/2002

Memorandum from Jeff Johnson, New Buildings Institute, Re; ACM Manual Appendix – Acceptance Testing, 10/28/2002

Letter from Mark Modera, Staff Scientist, Ernest Orlando Lawrence Berkeley National Laboratory, Re: HVAC Transport Efficiency Concept, 10/31/2002

"Outdoor Lighting Baseline Assessment, Integrated Energy Systems Productivity and Building Science." New Buildings Institute / RLW Analytics, 11/11/2002

"Compliance Using Ducts Buried in Attic Insulation." Steven Winter Associates, 12/12/2002

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Field Test Data on Non-Certified Cooling Towers, 1/14/2003

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Title 24 Requirements for Third Party Performance Certification of Evaporative Heat Rejection Equipment, 1/14/2003

"Duct Sealing Requirements upon HVAC or Duct-System Replacement: Light Commercial Buildings." Heschong-Mahone Group, Modera Consulting Engineers, Architectural Energy Corporation for Pacific Gas & Electric Company, 1/21/2003

"Nonresidential Duct Sealing and Insulation." Heschong-Mahone Group, Modera Consulting Engineers, Architectural Energy Corporation for Pacific Gas & Electric Company, 1/23/2003

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Title 24 Requirements for Third Party Performance Certification of Evaporative Heat Rejection Equipment, 2/3/2003

Letter from Cheryl English, Vice President of Technical Marketing Services, Lithonia Lighting. Re: 2005 Energy Efficiency Standards – Residential Lighting, 2/3/2003

Letter from Iain Campbell, President, York International Corporation. 2/13/2003. Re: Comments on Proposed Revisions to 2005 Building Energy Efficiency Standards, Workshop Draft #3, CTI Certification Requirements for Heat Rejection Equipment (California Building Code Title 24, Part 6), 2/4/03

Letter from Harold Jepsen, Electrical Engineer, The Watt Stopper, Re: 2005 Title 24 Standards Bi-Level Outdoor Lighting Provision, 2/27/2003

Email from Mark Hydeman, Principal, Taylor Engineering. Re: Footnote C in Table 112-H of the Proposed 2005 Building Energy Efficiency Standards, 3/13/2003

Letter from James E. Braun, Professor, Purdue University. Re: Demand Control Ventilation, 4/19/2003

Letter from F.L. Michell, President, Cooling Technology Institute (CTI), Re: Product Certification Requirements, 5/9/2003

Letter from Stephen C. Prey, Program Coordinator, Caltrans Energy Conservation Program, Re: Exterior Nighttime Lighting, 5/16/2003

"Impact Analysis." Eley Associates in association with Berkeley Solar Group, Enercomp, Itron\RER, Architectural Energy Corporation and RLW Analytics for the California Energy Commission, 06/20/2003

"California Outdoor Lighting Standards." California Energy Commission, Publication Number 400-03-015, 7/2003.

III. CONSIDERATION OF REASONABLE ALTERNATIVES, INCLUDING THOSE THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS

Prior to initiating this rulemaking, the Commission has held an extensive public process to identify proposals from the public for changes to the Standards, review the technical and cost effectiveness analysis of potential changes, and obtain public comment on multiple drafts of potential Standards language. The Commission held 14 full days of public workshops during this process. As a result of public comment during the scoping phase of the project, the Commission considered over 270 suggested ideas for Standards changes. Those ideas were reviewed and prioritized with particular emphasis placed on the following considerations:

- Whether or not the Commission made a commitment during the last update proceeding to address the proposed revision in this triennial update;
- The extent that public funds had been invested to develop the proposed revision for inclusion in this project;
- The extent of energy savings and demand reduction expected to be achieved by the proposed revision.

Based on that review the Commission chose 28 areas of proposed revision to extensively evaluate for feasibility and cost effectiveness. Many of the original 270+ ideas were related in some respect to the 28 areas selected for extensive evaluation, and those ideas were also considered in conjunction with the subsequent investigation of the 28 areas. A similar process was conducted for outdoor lighting.

During the public workshops on the investigation of feasibility and cost effectiveness of the potential revisions to the Standards, the Commission received a large number of comments related to improvement of the conceptual approach of the potential revisions. Based on these comments the

Commission developed draft Standards and held two public workshops to obtain public comment on the draft Standards. Numerous ideas for revision to the draft Standards were received, and the Commission extensively revised the draft Standards to respond to those comments. The proposed standards revisions are the result of this extended interactive process. During the course of this process the Commission also has received many letters, email and verbal comments on the potential standards and ideas for improving them. The proposed standards have been extensively shaped by response to those comments and ideas.

Many of the measures in the proposed Standards were originated, developed and/or sponsored wholly or in part by individuals or organizations, including time dependent valuation, alterations to existing residential buildings, residential water heating, duct insulation and duct sealing in nonresidential buildings, demand control ventilation, cool roofs, electronically commutated motors, cooling towers, skylights with daylighting controls, residential lighting, relocatable public school buildings, nonresidential lighting controls, gas cooling equipment, compliance credit for ducts buried in ceiling insulation.

In response to comments from the roofing industry, earlier versions of the requirements for cool roofs were rejected to simplify the labeling requirements for coatings, revise the requirements for coatings to be more widely applicable to the range of available products, clarify that the requirements for cool roofs apply only for specific building types and applications, include an option for tradeoffs between reflectance and emittance in the Overall Envelope compliance approach, and clarify the requirements for recovering of existing roofs and narrow the exception for roofs with rock or gravel surfaces. In response to California state agencies responsible for protection of indoor air quality, earlier versions of the provisions for demand control ventilation and natural ventilation were rejected to carefully delineate the applications where these ventilation strategies are allowed and required.

In response to comments from major heating, ventilating and air conditioning (HVAC) system designers and building commissioning authorities, earlier versions of the provisions for acceptance requirements were rejected to more narrowly define the approach and scope for these requirements. To respond to the comments of prominent lighting designers, energy compliance consultants and environmentalists, earlier versions of the new procedures for tailored lighting were rejected to narrow their application and make them more energy conserving.

To respond to the comments of the Division of the State Architect and manufacturers of relocatable public school buildings, earlier versions of the provisions for relocatables were rejected to be more clear, particularly to clarify that moving of relocatables that were originally permitted prior to the effective date of these Standards do not invoke the requirements of the Standards, and that moving of relocatables does not constitute an alteration under the Energy Standards (as long as no energy related features are altered in the move and the relocatable was originally approved for the climate zone to which it is being moved). In response to comments from building officials, earlier versions of the new lighting requirements for unconditioned buildings were rejected to provide exceptions for particular types of unconditioned buildings.

In response to comments from skylight manufacturers, earlier versions of the requirements for skylights with daylighting controls were rejected to make them more flexible and clear. In response to comments from cooling tower manufacturers, earlier versions of the requirements for certification of cooling towers were rejected to make them more specific and clear. To respond to comments from building officials, equipment manufacturers, HVAC contractors, and weatherization program experts, earlier versions of the requirements for duct sealing as part of alterations to existing residential and nonresidential buildings were rejected to make them more practical, narrow their scope, and provide specific exceptions.

In response to comments from lighting equipment manufacturers, lighting control manufacturers, lighting designers, industry organizations representing users of outdoor lighting, and building officials, earlier versions of the requirements for outdoor lighting were rejected to make them more achievable, narrow their scope, provide specific exceptions, provide greater discretion for local governments to define lighting

zones and areas of high illumination, and provide clarity. To respond to comments from sign manufacturers, earlier versions of the requirements for signs were rejected to make them more achievable, increase flexibility, provide simple but extremely cost effective prescriptive options, and eliminate the application of lighting zones to signs.

In response to comments from energy compliance consultants, earlier versions of the rules for performance standards compliance for additions and alterations to existing buildings were rejected to make them more achievable and provide clarity and specificity. In response to comments from energy compliance consultants, environmentalists, and the building industry, earlier versions of the requirements for residential lighting were rejected to add flexibility and clarity. In response to comments from the building industry and mechanical contractors, earlier versions of the requirements for duct insulation in low-rise residential buildings were rejected to reduce their stringency and make them more economically achievable.

In response to comments from insulation manufacturers and insulation installation quality control experts, earlier versions of the protocol and eligibility criteria for qualifying for compliance credit for high quality insulation installation were rejected to make them more achievable and more clear. In response to comments from mechanical contractors and HERS raters, earlier versions of the protocol and eligibility criteria for qualifying for compliance credit for ducts buried in ceiling insulation were rejected to make them more clear and achievable. In response to comment from the solar industry, the intent to leave unchanged the current procedures for evaluating the performance standards calculations for solar water heating systems was rejected to better align those procedures with industry rating procedures and make compliance credit more achievable. In response to comment from HERS raters, the building industry, and installation quality control experts, earlier versions of the procedures for field verification were rejected to make them more clear, address current problems with provider notification, and add a role for Third Party Quality Control Programs.

At this time the Commission is not aware of alternatives to the Standards that would be more effective in achieving the Commission's goals and Legislative direction. It is quite likely that during the course of the rulemaking, comments will be received that the Commission will deem are helpful in improving the proposed standards and the Commission expects to revise the proposed standards to take advantage of those ideas

IV. IMPACT ON BUSINESS

The Standards revisions will require cost effective energy efficiency measures for nonresidential buildings other than institutional occupancies. Some of the requirements will not increase costs relative to current good practice. However, often the requirements will result in an incremental increase in construction costs. The Standards revisions will result in important reductions in energy bills over the economic life of the structures. These savings will be substantially greater than the incremental increase in costs due to the requirements. The homeowners and building owners who are the beneficiaries of these cost reductions will receive increased business profits due to reductions in operating costs. Businesses that provide energy efficiency products and services associated with the Standards requirements will have expanded business opportunities. As a result there is the potential for creation of new jobs and an increase in California business competitiveness.

The evidence that the Commission relies upon in making this determination of no significant impact on business is the following documents:

"An Evaluation of Three Types of Gas Station Canopy Lighting." Lighting Research Center, 12/28/2001.

"Window Efficiency Requirements Upon Window Replacement." Heschong-Mahone Group in association with Enercomp for Pacific Gas & Electric Company, 03/15/2002

"Acceptance Requirements for Nonresidential Buildings." Publication Number P400-02-010. New Buildings Institute for the California Energy Commission, 04/08/2002

"Cooling Towers." Heschong-Mahone Group in association with Taylor Engineering for Pacific Gas & Electric Company, 04/08/2002

"Part I - Measure Analysis and Life-Cycle Cost." [Lighting Power Allowances, Demand Control Ventilation, Construction Quality (Walls), Water Heating Distribution.] Publication Number P400-02-011. Eley Associates in association with Benya Lighting Design, Taylor Engineering, Berkeley Solar Group and Davis Energy Group, 04/11/2002

"Multifamily Water Heating." Davis Energy Group for Pacific Gas & Electric Company, 05/07/2002

"Residential Hardwired Lighting." Heschong-Mahone Group for Pacific Gas & Electric Company, 05/07/2002

"Duct Sealing Requirements upon HVAC or Duct-System Replacement." Heschong-Mahone Group in association with Modera Consulting Engineers for Pacific Gas & Electric Company. 05/08/2002

"Updates to Title 24 Treatment of Skylights." Heschong-Mahone Group for Pacific Gas & Electric Company, 05/14/2002

"Part II – Measure Analysis and Life-Cycle Cost." [Residential Fenestration, Hydronics.] Publication Number P400-02-012. Eley Associates in association with Berkeley Solar Group, Enercomp Inc., and Taylor Engineering for the California Energy Commission, 5/16/2002

"High Performance Relocatable Classrooms." Davis Energy Group for Pacific Gas & Electric Company, 06/28/2002

"Nonresidential Duct Sealing and Insulation." Heschong-Mahone Group, Modera Consulting Engineers, and Architectural Energy Corporation for Pacific Gas & Electric Company, 07/02/2002

"Part III – Measure Analysis and Life-Cycle Cost." [Maximum Allowable Cooling Capacity, Residential Ducts, Residential Construction Quality-Attics, Revised Tailored Method for Allowed Lighting Power.] Publication Number P400-02-013. Eley Associates in association with Berkeley Solar Group, Enercomp, Inc., Proctor Engineering Group, Davis Energy Group and Benya Lighting Design for the California Energy Commission, 07/03/2002

"Inclusion of Cool Roofs in Nonresidential Title 24 prescriptive Requirements (Revised)." Hashem Akbari (LBNL) and Ronnen Leninson (LBNL) for Pacific Gas & Electric Company, 08/2002.

"Gas Cooling Compliance Options for Residential and Non-Residential Buildings." A.Y. Ahmed of Occidental Analytical Group, Davis Energy Group for Southern California Gas Company, 08/12/2002

"Part IV – Measure Analysis and Life Cycle Cost." [Electronically-Commutated Motors in Series Terminal Units, Size Thresholds for Variable Speed Drives, Lay-In Insulation in Nonresidential Buildings.] Publication Number P400-02-014. Eley Associates in association with Taylor Engineering, New Buildings Institute, Architectural Energy Corporation and Modera Consulting Engineers for the California Energy Commission, 08/13/2002

"Outdoor Lighting Baseline Assessment, Integrated Energy Systems Productivity and Building Science." New Buildings Institute / RLW Analytics, 11/11/2002

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Field Test Data on Non-Certified Cooling Towers, 1/14/2003

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Title 24 Requirements for Third Party Performance Certification of Evaporative Heat Rejection Equipment, 1/14/2003

"Duct Sealing Requirements upon HVAC or Duct-System Replacement: Light Commercial Buildings." Heschong-Mahone Group, Modera Consulting Engineers, Architectural Energy Corporation for Pacific Gas & Electric Company, 1/21/2003

"Nonresidential Duct Sealing and Insulation." Heschong-Mahone Group, Modera Consulting Engineers, Architectural Energy Corporation for Pacific Gas & Electric Company, 1/23/2003

Letter from James Furlong, Vice President of Sales, Baltimore Aircoil Company (BAC), Re: Title 24 Requirements for Third Party Performance Certification of Evaporative Heat Rejection Equipment, 2/3/2003

Letter from Cheryl English, Vice President of Technical Marketing Services, Lithonia Lighting. Re: 2005 Energy Efficiency Standards – Residential Lighting, 2/3/2003

Letter from Iain Campbell, President, York International Corporation. 2/13/2003. Re: Comments on Proposed Revisions to 2005 Building Energy Efficiency Standards, Workshop Draft #3, CTI Certification Requirements for Heat Rejection Equipment (California Building Code Title 24, Part 6), 2/4/03

Letter from Harold Jepsen, Electrical Engineer, The Watt Stopper. Re: 2005 Title 24 Standards Bi-Level Outdoor Lighting Provision, 2/27/2003

Letter from James E. Braun, Professor, Purdue University. Re: Demand Control Ventilation, 4/19/2003

Letter from F.L. Michell, President, Cooling Technology Institute (CTI).. Re: Product Certification Requirements, 5/9/2003

Letter from Stephen C. Prey, Program Coordinator, Caltrans Energy Conservation Program. Re: Exterior Nighttime Lighting, 5/16/2003

"Impact Analysis." Eley Associates in association with Berkeley Solar Group, Enercomp, Itron\RER, Architectural Energy Corporation and RLW Analytics for the California Energy Commission, 06/20/2003

"California Outdoor Lighting Standards." California Energy Commission, Publication Number 400-03-015, 7/2003.

V. DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

The proposed revisions to the Standards do not conflict with any federal regulations addressing the same issues. No federal regulations exist that prescribe building standards for non-federal buildings.